

TWO NEW SPECIES OF WOLF SPIDERS IN THE *PARDOSA MODICA* GROUP (ARANEAE, LYCOSIDAE) FROM NORTH AMERICA

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ABSTRACT. Two new species of wolf spiders in the *Pardosa modica* group (Araneae, Lycosidae) are described from North America: *P. knappi* from high-elevation lakeshores in the Sierra National Forest, California, USA, and *P. pedia* from prairie habitats in Saskatchewan, Canada.

Keywords: taxonomy, anatomy, lakeshore, prairie

North American members of the *modica* group of the genus *Pardosa* C.L. Koch 1847 comprise a cluster of more than 20 species of relatively large, dark, hairy spiders. One-half or more of these live among cobble-sized stones on beaches, or among boulders high in the Rocky Mountains. A few, such as *P. glacialis* (Thorell 1872) and *P. algens* (Kulczyński 1908), are high arctic forms. Still others inhabit swamps or bogs at lower elevations or lower latitudes. *Pardosa dromaea* (Thorell 1877) is unusual in habitat, ranging over the Central Plains.

The group has not been revised in total, though Holm (1967, 1970), Kronestedt (1975, 1981, 1988, 1993) and Dondale (1999) have treated most of the included species. Dondale & Redner (1990) and Vogel (2004) defined the group and published reviews, each of which includes a key to species.

Male specimens of the *modica* group can be recognized by the stout, horn-like or tooth-like terminal apophysis and short median apophysis with its beak-like basal process, in the pedipalp. Females possess a flask-shaped epigynal atrium and long, club-shaped spermathecae.

The purpose of this paper is to describe two new species in the group. Body measurements are in mm. Depositories of the type specimens are as follows: AMNH, American Museum of Natural History, New York, New York, USA; CAS, California Academy of Sciences, San Francisco, California, USA; CNC, Canadian National Collection of Insects and Arachnids, Ottawa, Ontario, Canada; DJB, private collec-

tion of Donald J. Buckle, Saskatoon, Saskatchewan, Canada; RSM, Royal Saskatchewan Museum, Regina, Saskatchewan, Canada.

SYSTEMATICS

Family Lycosidae Sundevall 1833

Genus *Pardosa* C.L. Koch 1847

Pardosa C.L. Koch 1847:100.

Acroniops Simon 1898:356.

Pardosops Roewer 1955:156.

Chorilycosa Roewer 1960:947.

Type species.—*Pardosa: Lycosa alacris* C.L. Koch 1833, by subsequent designation by the International Commission on Zoological Nomenclature (2003).

Acroniops: Acroniops heterophthalmus Simon 1898, by monotypy.

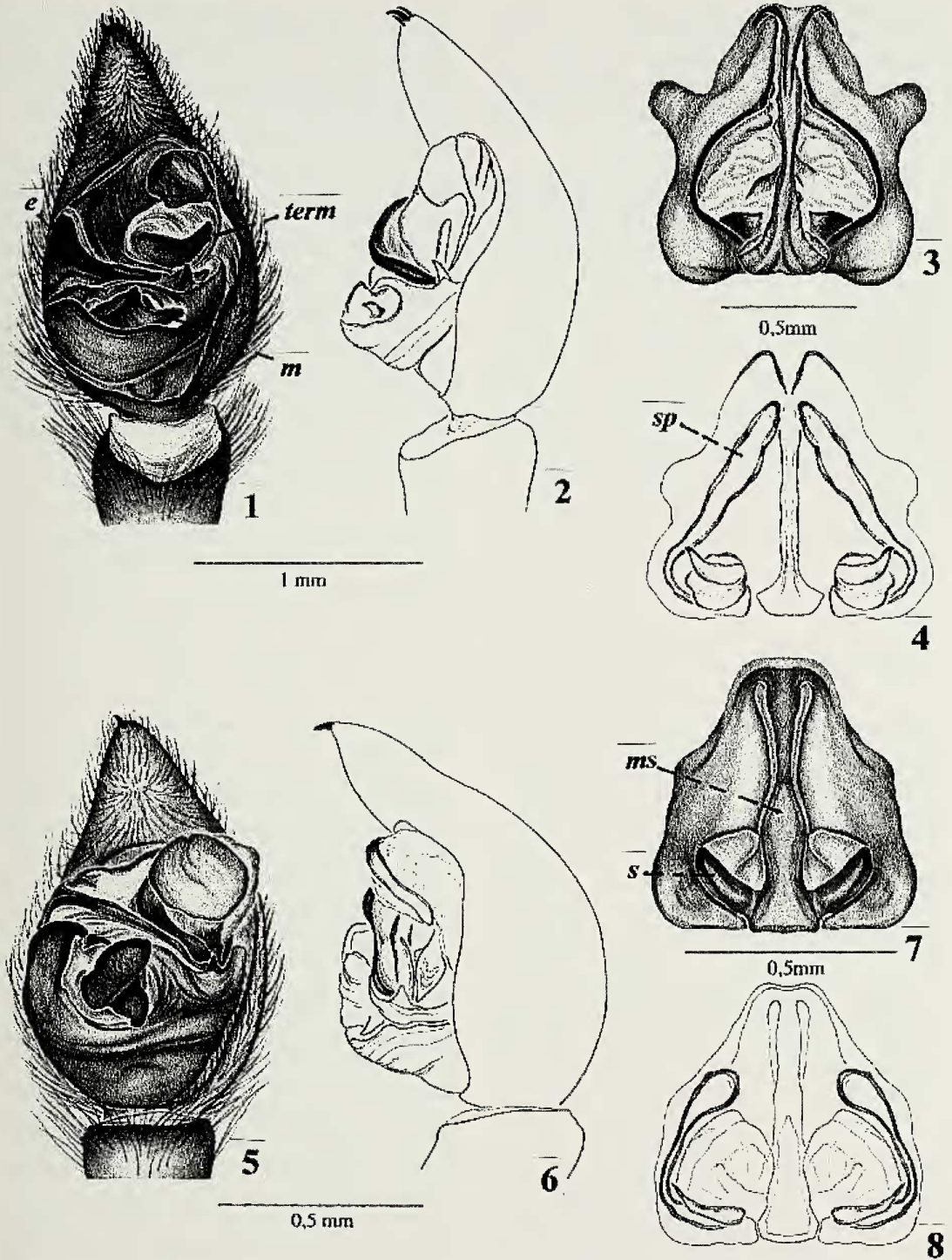
Pardosops: Lycosa pontica Thorell 1875, by monotypy.

Chorilycosa: Lycosa arorai Dyal 1935, by monotypy.

***Pardosa knappi* new species**

Figs. 1–4

Type specimens.—UNITED STATES OF AMERICA: *California:* Holotype male, Lower Humphreys Lake (37°15'N, 118°40'W), Sierra National Forest, Fresno County, 3596 m elevation, 30 July 2004, Roland A. Knapp (CAS). Paratypes: 2 females, Wedge Lake (37°16'N, 118°42'W), 3468 m elevation, 15 July 2004, Roland A. Knapp (CAS); 4 males, Mesa Lake (37°16'N, 118°43'W) 17 April 2003, Roland A. Knapp (AMNH); 1 male, Tomahawk Lake (37°15'N, 118°43'W) 3396 m elevation, 22 July 2004, Roland A. Knapp



Figures 1-8.—*Pardosa* spp. 1-4. *P. knappi* new species. 1, 2. Male holotype, pedipalp: 1. Ventral view; 2. Retrolateral view. 3, 4. Female paratype from Wedge Lake, California, USA, epigynum: 3. Ventral view; 4. Dorsal view. 5-8. *P. pedia* new species. 5, 6. Male holotype, pedipalp: 5. Ventral view; 6. Retrolateral view. 7, 8. Female paratype from Grassland National Park, Saskatchewan, Canada, epigynum: 7. Ventral view; 8. Dorsal view. *e*, embolus; *m*, median apophysis; *ms*, median septum; *s*, atrial sclerite; *sp*, spermatheca; *term*, terminal apophysis.

(CNC); 1 female, unnamed lake (37°15'N, 118°41'W) 3590 m elevation, 30 July 2004, Roland A. Knapp (AMNH); 1 female, unnamed lake (37°17'N, 118°42'W), 3547 m elevation, 3 August 2004, Roland A. Knapp (CNC).

Etymology.—The specific epithet is in recognition of the collector of the type series, Dr. Roland A. Knapp, Research Biologist at the Sierra Nevada Aquatic Research Laboratory, University of California at Santa Barbara, California.

Diagnosis.—*Pardosa knappi* males and females key to *P. bucklei* Kronstedt 1975 in Dondale & Redner (1990) and in Vogel (2004). They are distinguished from the latter by the narrower embolus and larger sclerite at the base of the embolus in males (Fig. 1), and, in females, by the more slender spermathecae, which have two swellings distally (Fig. 4). Both males and females measure, on average, approximately one-third larger than individuals of *P. bucklei*.

Description.—*Male holotype* (Figs. 1, 2): Carapace brownish black, with short pale median band at dorsal groove, and with pale lateral bands represented by 3 pairs of large spots. Legs basally black, grading to pale reddish brown distally; femur I with 2 dorsal macrosetae, 2 prolaterals (near tip), 0 retrolaterals; tibia I with 2 long dorsal bristles, 2 prolateral macrosetae, 2 retrolaterals, 3 pairs of ventrals; tarsus I with numerous erect setae. Sternum black. Chelicerae reddish black; promargin with 3 teeth, retromargin with 3. Abdomen black dorsally, with dull red heart mark; venter dull black. Pedipalp with stout curved horn-like terminal apophysis, broad straight truncated embolus, and large sclerite at base of embolus; median apophysis with beak-like basal process. Total length 9.63; carapace length 4.73; carapace width 3.74.

Female paratype from Wedge Lake, California, USA. (Figs. 3, 4): Coloration much as in male, but yellow spots on carapace more distinct, and legs showing faint banding. Epigynum with flask-shaped atrium and narrow, essentially straight median septum; septum widening abruptly at anterior and posterior extremities; atrial sclerites distinct, diverging anteriorly; spermathecae with two swellings. Total length 10.71; carapace length 4.65; carapace width 3.65.

Variation.—*Males* ($n = 5$): carapace and

legs vary from deep black to dull red, and tarsi from reddish to straw yellow. Total length 9.00–9.63 (mean \pm 1 standard deviation: 9.13 ± 0.21); carapace length 4.23–4.96 (4.69 ± 0.26); carapace width 3.24–3.82 (3.54 ± 0.21). *Females* ($n = 3$): total length 9.71–10.79 (10.25 ± 0.50); carapace length 4.15–5.15 (4.72 ± 0.42); carapace width 3.22–3.90 (3.60 ± 0.29).

Natural history.—All specimens in the type series were collected among rocks on lakeshores in the Sierra National Forest at elevations of 3396–3596 m.

Distribution.—Known only from Humphreys Basin, Sierra National Forest, California, but may be more widespread in other parts of the alpine zone of the Sierra Nevada.

Pardosa pedia new species

Figs. 5–8

Type specimens.—CANADA: *Saskatchewan*: Holotype male, Grasslands National Park (49°10'N, 107°24'W) 11–14 July 1996, A.T. Finnamore (CNC). Paratypes: 3 females, same data as for holotype (CNC); 1 male, same locality, 7–10 July 1996, A.T. Finnamore (DJB); 2 females, same locality, 24–27 July 1996, A. T. Finnamore (CNC); 1 female, same locality, 25–28 July 1996, A. T. Finnamore (DJB); 1 male, 32 km southwest of Beechy (50°43'N, 107°23'W) 3 June 1970, Mike Gollop, from gullet of bird (*Eremophila* sp.) (much damaged) (CNC); 1 male, 10 km south of Cadillac (49°31'N, 107°50'W) 30 May–5 June 1995, J. Pepper (RSM).

Etymology.—The specific epithet is from the Greek word *pedios*, one meaning of which is “dweller of the plains” (Jaeger 1955).

Diagnosis.—This species is not identifiable by the use of published keys owing to the variable number of teeth on the cheliceral retromargin. Males and females most resemble those of *P. furcifera* (Thorell 1875) in size, color, and generalities of the external genitalia. Males differ in the flattened, curved, truncated embolus and much smaller terminal apophysis, and females by the large, distinct atrial sclerites in the epigynum. In both sexes, the lateral bands on the carapace are represented by a series of spots rather than being entire. The habitat also differs: the available specimens of *P. pedia* were found in prairie habitats, whereas those of *P. furcifera* occupy the ground layer of spruce/willow thickets

near the treeline in the boreal forest as well as the arctic tundra itself (Dondale & Redner 1990, map 43).

Description.—*Male holotype* (Figs. 5, 6): Carapace black, with short yellow median band and with lateral bands each represented by a series of yellow spots; front with yellow margin. Legs pale yellow, covered with fine pale pubescence; femora with indistinct dark bands, which are more evident dorsally; femur I with 3 dorsal macrosetae, 2 prolaterals (near tip), 2 retrolaterals; tibia I with 2 dorsal bristles, 2 prolateral macrosetae, 1 retrolateral, 3 pairs of ventrals. Sternum light brown. Chelicerae yellow, darker laterally; promargin with 2 teeth, retromargin with 2. Abdomen black on yellow background, with distinct yellow heart mark; venter pale yellow. Tibia and cymbium of pedipalp dark brown, other segments yellow; tibia covered with erect black setae; cymbium covered with short, semi-erect black setae; terminal apophysis small, tooth-like; embolus long, slender, nearly straight, with tip somewhat flattened and curved; median apophysis with short, broad distal process and short curved basal process. Total length 5.48; carapace length 2.68; carapace width 2.16.

Female paratype from the type locality (Figs. 7, 8): Coloration much as in male holotype, but carapace dark brown rather than black, and leg bands more distinct. Epigynum with median septum long, straight, and narrow, but somewhat widened posteriorly; atrial sclerites large, distinct, pointed; copulatory tubes slender, curved; spermathecae bulbous, with few minute nodules. Total length 6.23; carapace length 2.84; carapace width 2.08.

Variation.—*Males* ($n = 2$): the sternum may appear dark brown, and tibia I may have dark bands as well as the femur. Total length 5.98, 6.47; carapace length 2.99, 3.49; carapace width 2.18, 2.24. *Females* ($n = 5$): the slender part of the median septum may extend farther posteriorly than shown in Fig. 7. Total length 5.06–6.47 (5.92 ± 0.64); carapace length 2.68–3.49 (3.00 ± 0.17); carapace width 2.08–2.49 (2.25 ± 0.19). In both sexes, the cheliceral retromargins have 2 teeth in some specimens, 3 in others.

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